

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-150759

(43)Date of publication of application : 02.06.1998

(51)Int.Cl.

H02K 33/16

H01F 7/16

(21)Application number : 08-320744

(71)Applicant : SEIKO INSTR INC

(22)Date of filing : 15.11.1996

(72)Inventor : HAYASHIZAKI SHINICHI

KIMURA REIKO

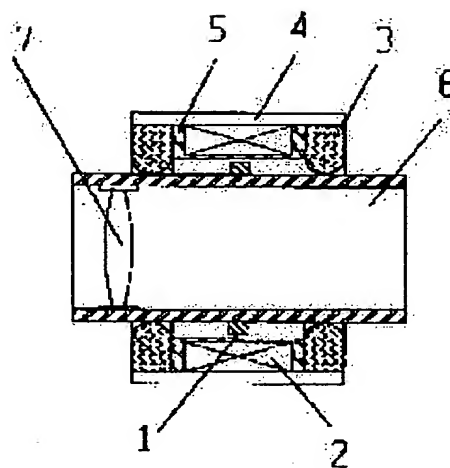
HIROYOSHI HIDETOSHI

## (54) LINEAR ACTUATOR

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To eliminate the decline in the thrust of a device even if the device is small-size and hollow while the thicknesses of a magnet and a coil of a thrust generating section are made small by locating the ring-shaped permanent magnet, the cylindrical coil, a hollow shaft, and a cylindrical case concentrically and developing the thrust in the axis direction.

**SOLUTION:** A ring-shaped permanent magnet 1 is fixed to a hollow shaft 6 to constitute a movable body. A coil 2 is a hollow and cylindrical coil wound round a bobbin 5 and is located around the magnet 1 at a little space. A cylindrical case 4 made of soft magnetic material is located around the coil 2 and serves not only as the case but also as a back yoke which constitutes a magnetic circuit. The magnetic flux generated by the permanent magnet 1 which constitutes a movable body interlinks with the coil 2 and when current is caused to flow in the coil by an external power supply, the thrust appears in the coil 2 based on Fleming's left hand rule. However, the coil 2 is fixed, and so the thrust appears as reaction force in the permanent magnet 1 which is a movable body.



## LEGAL STATUS

[Date of request for examination]

20.08.1997

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

2939725

[Date of registration]

18.06.1999

[Number of appeal against examiner's decision]

of rejection]

[Date of requesting appeal against examiner's  
decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office